Document electronically
generated from the
United Nations
Optical Disk System

A Grain of Salt

The way to free the world from iodine deficiency disorders

UNICEF/92-788/Lemoyne

Sal Yodada

¡la sal de la vida!

unicef

United Nations Children's Fund

IODINE
SALT

A Grain of Salt

The way to free the world from iodine deficiency disorders

Intellectual capital is a crucial resource for national and international development. Yet a nutritional deficiency that can be readily prevented continues to rob whole generations of hundreds of millions of IQ points.

Iodine deficiency is the single greatest cause of preventable mental retardation in the world today. For lack of a modicum of iodine in their diets, 1.6 billion people worldwide are at risk of the diminished mental and physical capacities of iodine deficiency disorders, or IDD, as this range of afflictions is called.

This booklet was prepared to help bring attention to the pernicious problem of iodine deficiency, assess some of the progress made and offer suggestions for raising awareness of IDD among the media, health care professionals, industrial and commercial leaders, lawmakers, educators and the general public.

The solution: Salt iodization

For at least half a century, endocrinologists have known that as little as a teaspoonful of iodine taken over the course of a lifetime can spell the difference between normal development and IDD. In the last 20 years or so, the losses suffered in human potential — particularly mental acuity — have become clearer, yet publicizing IDD and the most effective solution remains a challenge.

As M.G. Venkatesh Mannar wrote in an essay for *S.O.S. for a Billion: The Conquest of Iodine Deficiency Disorders*, a book by B.S. Hetzel and C.S. Pandav, "If iodized salt containing the required amount of iodine is widely available and consumed in a community, there will, in a year's time, be no further births of cretins or children with subnormal mental or physical development which can be attributed to iodine deficiency... Children will be more active and perform better in school."

Salt iodization has a proven record of success. In Switzerland and parts of the United States, IDD was a chronic problem until the 1920s. The iodization of edible salt in these and other industrialized countries was the most direct factor in eliminating IDD. Experience has shown that iodizing edible salt is the most efficient method of providing this micronutrient, since most human beings consume salt on a daily basis.

The high price of IDD: 'Brain drain' and more

The intellectual and physical losses IDD causes, even in areas classified as mildly iodine-deficient, are enormous. Researchers estimate that each child in such areas may forfeit as many as 10 to 15 IQ points, a fact of great importance as countries with shrinking budgets struggle to educate children.

Fortunately, some of the deficit can be recouped once adequate iodine is taken. A study in Malawi showed that youths treated for iodine deficiency made striking improvements in coordination, verbal acumen and visual memory. Researchers estimated their average gain at 21 IQ points.

IDD also causes poor eye-hand coordination, partial paralysis, deaf-mutism, dwarfism, facial and physical deformity, cretinism, neurological damage, goitre and lassitude. Since iodine is essential during foetal development, babies born to iodine-deficient mothers can be impaired irreversibly. The chances of miscarriage, stillbirth or prematurity rise significantly if a pregnant woman is iodine deficient. If born alive to an iodine-deficient mother, a child may exhibit some or all of the defects associated with IDD, including compromised growth and development, mental retardation or cretinism, clumsiness, torpor, muscular rigidity, immature skeletal development and other disabilities.

UNICEF/1562/Witlin

Each child in mildly iodine-deficient areas may forfeit as many as 10 to 15 IQ points, a fact of great importance as countries with shrinking budgets struggle to educate children..

Children at school in Bolivia.

Remedying IDD by iodizing all edible salt is a relatively simple proposition that costs about 5 US cents per person per year. However, people in 118 countries, including one third of the population of China, are still imperilled by IDD. Of all those at risk, 20 million are believed to be intellectually handicapped. While much progress has been made in iodizing the world's edible salt supply, further ground must be gained if nations are to meet one of the most feasible goals of the World Summit for Children: the virtual eradication of IDD by the turn of the century.

In 1990, countries gathered at the World Summit for Children in New York pledged to eliminate IDD as one of 27 health and social development goals to reach by the year 2000. Subsequently, more than 170 countries agreed to set an interim goal for the end of 1995: iodization of at least 90 per cent of the world's edible salt. Reviewing what has been accomplished in the first half of the 1990s and what remains to be done provides a fresh opportunity to come up with new strategies for publicizing the problem of IDD and speeding its elimination.

IDD: A widespread danger

Long thought a problem exclusively in remote, often land-locked, mountainous regions in Asia, Africa and South America, iodine deficiency presents a danger in a wide range of geographical areas, anywhere that rain or floods, ancient glaciers, deforestation or erosion have robbed the soil of iodine. It also exists where people do not eat a diet rich in seafood or where food is grown or animals are raised on iodine-poor soil.

IDD persists in parts of the industrialized world, including Germany, Luxembourg and Eastern Europe. It afflicts as well the residents of a number of capital cities, including Beijing, Delhi and Manila. Animals, as well as humans, are vulnerable, suffering stillbirth, infertility, goitre and all the other costly effects of IDD. Their meat and other products are deficient in iodine.

Goitre, a swelling caused by growth of the thyroid gland, indicating that it is working overtime, was for many years the most obvious and readily recognized symptom of iodine deficiency. The condition is viewed differently by different cultures: many people still believe goitre to be merely a cosmetic, rather than a health, problem. In eastern Morocco, young women with goitre are rejected as brides. On the other hand, in some parts of Nepal, goitre is so widespread that it is considered a beauty mark. Only those who are well informed about IDD recognize goitre as a signal that the body is starved of iodine and is labouring to absorb it.

This map does not reflect any position on or recognition of territories under dispute.

The prevalence of goitre is the index by which epidemiologists track IDD in a given population. According to the World Health Organization, populations at risk of IDD are those in which the total goitre rate (TGR) is greater than 5 per cent in schoolchildren. The school-age population TGR is between 15 and 20 per cent in Africa. The TGR soars to an average of about 23 per cent in the eastern Mediterranean, affected by high rates in countries such as Syria, at a disturbing 73 per cent.

In general, goitre rates are lower in industrialized countries, but as noted earlier, IDD remains a problem in Germany where 10 per cent of schoolchildren suffer from goitre and 10 million Germans are at risk of IDD. Italy has a TGR of 20 per cent and Croatia, 25. Worldwide, the prevalence of goitre is estimated at 12 per cent, with 655 million people affected.

UNICEF 93-BOU0636/Press

Prevention, control and eventual elimination of IDD require a long-term, sustainable programme in which all salt for human and animal consumption is fortified with iodine.

Children in an orphanage in Somalia.

In the mountainous Cordillera province of the northern Philippines, a 1991 study found that as many as 70 per cent of children exhibited signs of goitre. Seventeen-year-old Evelyn Bulanit, a resident of Cordillera, is barely half as tall as her 12-year-old sister, and she walks with the pigeon-toed gait of a cretin. It is too late to protect Evelyn from the irreversible mental and physical effects of IDD, but the recent opening of a salt iodization plant in the province bodes well for the next generation.

The challenges of fighting IDD

While relatively simple and inexpensive, the process of eliminating IDD poses undeniable challenges.

Spreading the word: One of the most crucial of these challenges is raising awareness of how widespread and damaging iodine deficiency is. Although 1.6 billion are at risk of IDD, most people know nothing about it and even many health care workers remain unaware of the full impact IDD has, particularly on mental development. The public needs to know that once salt is iodized, a crucial collective step has been taken that changes the course of a nation's developmental future. It occurred in Switzerland and the United States, and it can happen throughout the world.

The causes, effects and most effective solution to the problem all need to be explained and repeated, in a number of formats and ways, in order to inform people and influence their behaviour. One family in Bolivia, a field researcher discovered, had purchased iodized salt, but had not used it, instead storing it in a chimney. Asked why, they replied: "Because nobody has goitre so far," believing that iodized salt was to be used only once goitre had developed.

Yet a story from Indonesia, where 55 per cent of the nation's edible salt has been iodized in recent years, shows that it is never too late to tell people about the causes of IDD and the way the awful toll can be averted. One woman who was iodine deficient and who had three seriously affected children bore a healthy son after learning about IDD and receiving iodine supplementation. Her daughter, born a cretin because of her mother's earlier iodine deficiency, also received iodine and she too has given birth to a child free of IDD.

The media are powerful allies for explaining the benefits of iodization and the enormous risks and losses associated with IDD. Radio, television, print media, public service announcements and poster campaigns are all ways of getting the message across. Women's groups, sports figures, dance and theatre troupes and educators can all be enlisted.

Iodine is one of three micronutrients — vitamin A and iron are the other two — that are the focus of a new campaign called the Supernutrient Communication Project, an effort of the Program Against Micronutrient Malnutrition (PAMM) and other organizations including the International Council for the Control of Iodine Deficiency Disorders (ICCIDD), Kiwanis International, the Micronutrient Initiative and UNICEF.

These micronutrients — so labelled because they are needed in only small amounts — are fast acquiring the name of 'supernutrients' because of their enormous benefits. Small amounts of iron can lower the terrible toll of maternal deaths associated with anaemia and blood loss. Sufficient vitamin A will raise disease resistance and thus prevent the deaths of between 1 million and 3 million children each year and more than 250,000 cases of deficiency-related blindness.

One of the campaign's goals is to build a broad coalition of partners. Links with sports bodies and individual sports figures will be sought, as well as with the media. A number of distinguished women — including first ladies, senior government officials and sports figures — have already signed on to the effort.

Education is another avenue to be explored, with the goal of incorporating supernutrient information in school curricula. Production and marketing advice on the best ways to reach people with fortified food products will be sought from partners in the food industry. The fortification of salt with iodine — the most widespread and successful of food fortification efforts so far — is a prototype on which further successes can be built.

Bringing governments on board: No effort to eliminate IDD can be successful without the full support of governments. Government officials, as well as the general public, need to be aware of the threat to their people that iodine deficiency poses, because only then can they provide the leadership and commit the resources needed to end the problem.

It is only with governmental support that the necessary laws can be enacted — and enforced — to ensure that only iodized salt is produced and sold and that iodization levels are adequate. Because once salt iodization is instituted, it must be sustained forever, and constant vigilance is needed to ensure the quality and consistency of the process. Both governments and private salt producers play significant roles in sustaining and monitoring salt iodization.

Not only the iodization process, but also the marketing of iodized salt must be monitored and regulated. Iodized salt that is not protected from the elements and from certain climatic conditions — particularly heat, moisture and direct sunlight — will lose iodine. If packaged in polyethylene plastic and properly stored, salt can retain iodine for at least a year and perhaps as long as three years. However, removed from the original container, left outdoors or exposed to moisture, salt loses iodine rapidly, sometimes in as little as half an hour.

Governments — along with private salt producers — face the challenge of creating the monitoring evaluating systems necessary to ensure quality control in the production and distribution of iodized salt. And to have a clear picture of the impact achieved on the nation's health, iodine levels in the population will need to be monitored on a routine and ongoing basis, as part of routine health assessments, to ensure that progress continues to be made.

Such monitoring was not instituted in Colombia, where universal salt iodization was achieved through a programme begun in 1970. But when the late UNICEF Executive Director James P. Grant visited the presidential palace in Bogota years after the programme began and tested the table salt at a State dinner, he found it was not iodized. Because of lack of monitoring, the scourge bequeathed by glaciers and floods that leached iodine from the soil millennia ago recurred in Colombia.

Making the private sector partners in public health: The understanding and support of salt producers are indispensable if IDD is to be eliminated.

In countries where salt is imported or produced by a few large firms, universal iodization can be comparatively easy to achieve once the salt producers or importers are on board and the mechanisms, systems and regulations are in place. Complications arise in places where scores of small artisans produce salt using very simple technology, sometimes selling it for less than the iodized variety. For the sake of all consumers, these small producers need to be located and induced to buy or make their own simple and effective iodization equipment. Or they can be persuaded to pool their resources and form cooperatives for iodization, or to sell their salt to plants where it may be iodized. Where salt production is a private industry, governments need to work with business owners and manufacturers to provide incentives for them to institute iodization and quality control measures.

One challenge is helping small salt producers, with little or no technology, to form cooperatives to iodize their product. Sometimes incentives, such as subsidies and grants, may be needed to help small producers get started.

A small salt plant in Bangladesh.

UNICEF/93-BOU0026/Murray-Lee

Progress made in combating IDD

Genuine advances have been made in the battle against IDD. The Andean nations of Bolivia and Ecuador were once among the world's worst IDD-afflicted regions. The Government of Bolivia passed legislation requiring that all salt consumed by animals and human beings be iodized in 1968, but it was not until 1984 that a national programme was launched, yielding impressive results. Where once cretinism was rampant in Bolivia and only 5 per cent of the people had access to iodized salt, today there are no new cases of cretinism and a 1994 survey showed that 82 per cent of Bolivian households use iodized salt.

In Ecuador, where residents of the mountainous regions habitually consumed uniodized salt intended for animals, the national campaign used short-wave radio broadcasts in Spanish and the Quechua language and enlisted the support of rural schoolteachers. The Government monitors the iodization level of salt sold by five private producers, and 80 per cent of Ecuadorians who live in the Andes mountains consume only iodized salt. An area once hard hit by IDD, Ecuador has now declared itself free of the problem.

Significant progress also has been documented in Bangladesh, Bhutan, China, India, Pakistan and Peru, to name but a few. In China, where iodine deficiency has been a problem throughout history, some 60 million IQ points are estimated to be lost to IDD every year. However, in September 1993, in a meeting held in the Great Hall of the People in Beijing, the nation vowed to eradicate IDD by the end of this century.

In emergency conditions, where universal iodization of salt still is in the process of being implemented, iodized oil capsules or injections are safe, effective treatments for IDD. Furthermore, the benefits that millions reap from consuming this essential micronutrient far outweigh the extremely slight risk of hypertoxicity.

UNICEF/Koh

In Albania, over 40 per cent of schoolchildren show signs of goitre. In Croatia, the rate is 25 per cent, in Greece 10 per cent and in Turkey over 35 per cent.

Children in Albania.

Giving iodine centre stage:
Ideas for raising awareness of IDD

Each country may wish to designate its own 'IDD Day' on which to hold lectures, panel discussions, workshops, field trips and awards ceremonies. On this occasion, prizes would be presented to students of all ages for the best posters, essays or science projects about overcoming iodine deficiency. By holding an IDD Day each year, opportunities for publicity, media coverage and focusing attention on IDD can be increased.

For educators

1. Elementary school

✎ **Add the testing of salt to the curriculum. Children could be asked to bring salt from home to determine if it is iodized. Local UNICEF offices can provide salt-testing kits at approximately 50 US cents each. The process is simple and vivid: if the salt turns blue, it is iodized.**

✎ **Hold a nationwide poster competition on IDD. Children could be encouraged to illustrate the benefits of iodizing salt and eliminating IDD. Topics might include food preparation using iodized salt, markets selling iodized salt, factories that iodize salt, etc. An awards ceremony covered by the media would provide an opportunity to educate the public about IDD.**

✎ **Hold a nationwide essay competition on IDD. Students could be asked to submit short essays about the need to iodize salt and eliminate IDD. Winners' work could be published by a cooperating newspaper or magazine, and the media could be encouraged to cover the awards ceremony.**

✎ **Organize children's parades or parties, perhaps in connection with a national festival or feast day. Placards and floats could be designed showing the benefits of iodizing salt.**

✎ **Arrange field trips to local salt producers to show children the iodization process and to involve local businesses in explaining their role in addressing a public health problem.**

2. Secondary school

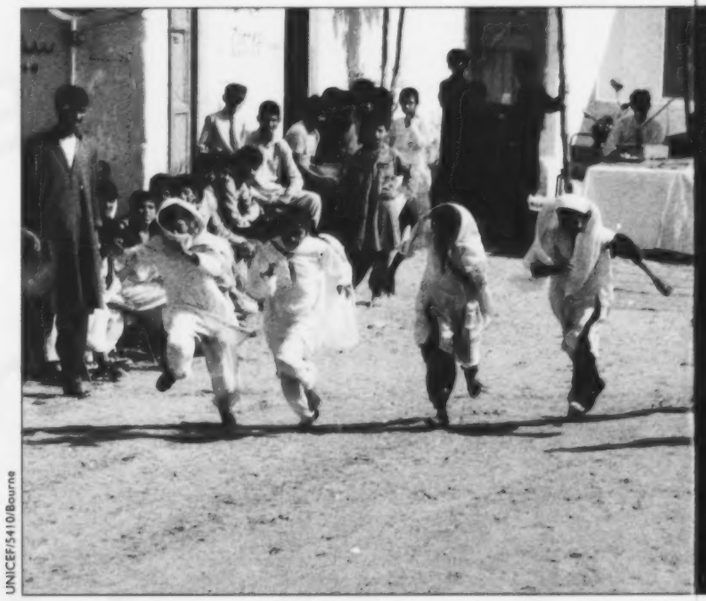
✎ Encourage the testing of salt samples from local restaurants or public cafeterias to determine if salt is iodized, as part of a science or biology class. Simple, easy-to-use, salt-testing kits could be made available by UNICEF.

✎ Launch a nationwide IDD essay competition. Students could write essays advocating salt iodization and discussing the benefits of eliminating IDD. The winning essays could be published in magazines or newspapers popular with young people.

✎ Invite salt producers to school for panel discussions on the benefits of iodization in eradicating IDD.

✎ Use health and biology classes to link iodine to the endocrine system and explain the body's need for iodine. Hold a science fair, asking students to design projects demonstrating the effects of IDD and the benefits of salt iodization. The prize giving would provide an opportunity to publicize IDD.

✎ Encourage classes to develop a marketing campaign for iodized salt, design an iodization logo and write IDD slogans.



UNICEF/5410/Bourne

As little as a teaspoonful of iodine taken over the course of a lifetime can spell the difference between normal development and IDD. Almost all nations of the world now endorse and support the goal of eliminating IDD from the world by the year 2000 through the iodization of salt.

Girls race in Pakistan.

3. College and university

✎ Research projects could be carried out in collaboration with governmental departments and ministries, to assist in the assessment and monitoring of salt iodization and the elimination of IDD.

✎ Health and biology classes could be used to teach students about the links between iodine and the endocrine system and to explain the body's need for iodine.

✎ Surveys could be conducted in association with public agencies to determine the nation's needs and priorities with respect to IDD, and to identify which regions are most at risk.

✎ Projects specific to law schools could be carried out, evaluating existing legislation and proposing improvements.

✎ Projects specific to agricultural schools could be carried out, evaluating the level of iodine in locally grown foods and the needs of livestock for iodine. The financial costs of IDD to farmers and animal keepers could be analysed and tabulated.

✎ Projects specific to technical schools could be carried out, involving the design of iodization equipment to be produced locally.

✎ Projects specific to medical schools could be carried out, researching iodine deficiency. Medical students could design information materials to raise public awareness and programmes to treat those suffering from IDD.

For media activities

1. Print media

✎ Short (750-word) essays advocating salt iodization and calling attention to IDD could be submitted to the nation's leading newspapers, to be published on the 'op-ed' page — opposite the editorials. Such essays might focus on the nation's programmes to address iodine deficiency and to sustain the iodization of salt.

✎ Articles about IDD by nutrition experts and others in the medical field could be submitted to popular health and science magazines to raise awareness of IDD.

✎ Reporters could be invited to visit salt plants and interview industry executives about their contributions to the nation's salt iodization programme.

2. Radio and television

✎ Radio and television programmes about IDD and efforts to iodize salt could be developed as key elements in a national education drive.

✎ Coverage of local IDD-related events, such as a panel discussions, press conferences or awards ceremonies, would heighten public knowledge of iodine deficiency.

✎ Public service announcements by a celebrity sponsor (such as film star Roger Moore, a UNICEF Special Representative) or local celebrities and/or sports figures could be broadcast, endorsing iodization and raising funds for IDD programme support.

3. Other communication projects

✎ Organize round-table discussions with health authorities on IDD.

✎ Organize panels to discuss the impact of salt iodization laws and how effectively they are being enforced.

✎ Sponsor activities, press conferences or on-site visits with salt manufacturers, traders and/or retailers.

✎ Use entertainment or sports events as a focus for IDD education or advocacy. For example, festivities at a soccer match might illustrate the importance of salt iodization.

✎ Enlist national celebrities (film and sports stars, for example) to support iodization.

✎ Create eye-catching logos for salt packaging.

✎ Create messages for salt packaging, educating consumers about the need for iodine in their diets.

✎ Create a public service announcement campaign, using the national celebrities enlisted to support IDD.

✎ Coordinate such public service announcements with major national feast and festival days, with the suggestion that edible salt be checked for iodization at such times.

✎ Create posters for display at health clinics, railway and bus stations.

✎ Design bumper stickers urging the use of iodized salt.

✎ Work with women's groups, nutritionists and cooking schools to develop information activities about iodized salt.

For industrial and business leaders

✎ Invite business leaders to seminars and conferences to share ideas and pinpoint problems and needs.

✎ Encourage salt producers to include a description of the benefits of iodization on salt packets to educate consumers.

✎ Work with businesses to sponsor an IDD scorecard to be displayed at sporting events or national events, showing the proportion of iodized salt in the country.

✎ Contact: Salt Institute in Alexandria, Virginia (USA), at tel. (703) 549-4648 or fax (703) 548-2194 for referral to consultants knowledgeable about salt iodization in your region.

For public health officials and nutritionists

- Prenatal caregivers can be trained to inform expectant mothers of the need for iodine in their diets during pregnancy and in the child's diet.
- Make a lesson on IDD part of the procedure of registering marriages and/or births with civil and religious authorities.
- In severe IDD situations where salt iodization is not yet universal, provide iodized oil or capsule treatment for pregnant women and those most affected by IDD.
- Ensure that clinics educate patients about the benefits of iodized salt as part of a preventive medicine programme.

For lawmakers

- Ensure that your nation has passed laws requiring iodization of salt and prescribing penalties for non-compliance.
- Where needed, draft legislation requiring the iodization of salt and campaign for its swift passage. If possible, incorporate salt iodization into existing food legislation, to make it easier to pass and to amend later, if necessary. Consult with public health officials to determine the level of iodization needed.
- Bring IDD up in national debates and in parliament.
- Work to have a government entity, such as the Ministry of Health, made responsible for regulating and monitoring the levels of iodine in salt at production, importation, distribution and consumption.
- Where legislation has been passed, ensure that efforts to iodize all edible salt produced, imported or marketed in the country are sustained.
- Where needed, offer incentives for small manufacturers to sell their salt to factories or plants where it will be iodized.
- Where needed, offer incentives for small salt manufacturers to form cooperatives where they can have access to iodization equipment and appropriate packaging materials.

Kiwanis International

International Council for the Control of Iodine Deficiency Disorders (ICCIDD)

Micronutrient Initiative (MI)

Program Against Micronutrient Malnutrition (PAMM)

UNICEF

World Health Organization (WHO)

UNICEF
Three U.N. Plaza
New York, NY 10017
USA
Fax: (212) 326-7768

Printed on recycled paper

Inside front and back covers: Illustrations by Falguni Gokhale, for the Government of India and UNICEF New Delhi

Cover border: Iodization logos and symbols from Bangladesh, Bhutan, Bolivia, India, Nigeria, Pakistan, Peru and the Philippines

August 1995